

LIVERMORE LAB REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Nov. 5-9, 2012



Lawrence Livermore has a long history of combating persistent cyber threats through its cyber security program. Now the Lab is sharing that approach through real time sharing of reputation data with other Department of Energy laboratories.

This program has earned the Lab a 2012 U.S. National Cybersecurity Innovation Award for proving that defenders can work together to exterminate cyber bugs and improve security.

The program, dubbed the Master Block List, or MBL, was developed by DOE's Focused Advanced Persistent Threat Group led by LLNL. It allows any application to be easily enrolled to automatically share up-to-the minute data on malicious Websites, hashes and spear phishers with all others that participate in the MBL.

It also allows multiple labs and plants to share block information in real time.

To read more, go to [Yahoo](#).





Americans used less energy in 2011 than in the previous year mainly because of the transportation and residential sectors' embrace of higher-efficiency technologies, such as wind power and hydroelectricity, according to the latest energy flow chart from Lawrence Livermore.

Total energy use in the United States fell from 98 quads (the standard unit of measure) in 2010 to 97.3 quads in 2011, the flow chart shows. Wind power surged from .92 quads in 2010 to 1.17 quads in 2011, as more wind farms came online, and hydroelectricity rose from 2.51 quads in 2010 to 3.17 quads in 2011, mainly because heavy rainfall in the Western United States helped power dams.

The latest LLNL flow chart does not break down residential energy use. But ongoing efficiencies within the built environment have helped control total energy consumption. For example, today's homes use the same amount of energy as those built in the 1970s, thanks to increased efficiency of appliances, lighting and other products.

To read more, go to [Consumer Reports](#).



SNAKESKIN FOR SOLDIERS



Highly breathable membranes have pores made of a few nanometer-wide vertically aligned carbon nanotubes.

Lawrence Livermore has created a new material for military uniforms that can automatically repel chemical and biological agents -- and shed contaminated layers like a snakeskin.

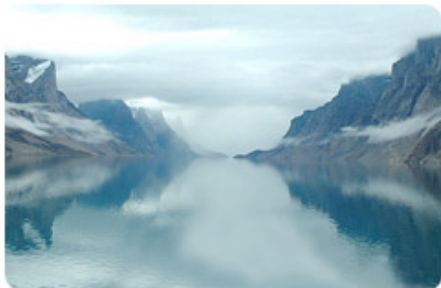
The new fabric, which is made from tiny carbon nanotubes, has pores just a few nanometers wide (that's smaller than a human hair). When a warfighter encounters a chemical or biological attack, the fabric switches from resting into a protective state, closing those pores to block the attack.

As an added defense mechanism, this second skin will peel off or shed the contaminated surface layer, like a snake shedding its skin. Just as human skin responds to threats, so too will the fabric exfoliate in reaction to chemical agents.

To read more, go to [Fox News](#).



AN UNNATURAL PROBLEM



CO2 emissions from cars and fossil fuel burning power plants are causing the world to warm up.

Lawrence Livermore atmospheric scientist Ben Santer says we have a huge problem on our hands. "We know beyond a shadow of a doubt that our activities will change the chemical composition of the Earth's atmosphere. That's not a belief system, that's not speculation. We know that."

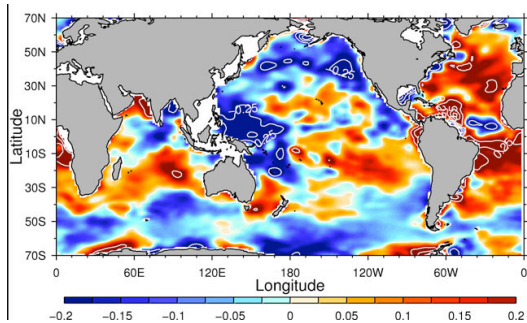
Santer says we know it by looking at carbon measurements that provide a unique fingerprint of burning fossil fuel. He also says the complex pattern we're in doesn't match a natural cycle.

"The most plausible explanation for these changes has to involve a strong human finger print."

Santer says there has been a 30 percent increase in carbon dioxide observed in the atmosphere since the industrial revolution.

To read more, go to [Northlands News Center](#).

SALT OF THE OCEANS



Surface salinity changes for 1950 to 2000, units express absolute salinity changes for the 50-year period. Red indicates regions becoming saltier, and blue regions becoming fresher.

Changes in ocean salinity over the second half of the 20th Century are consistent with the influence of human activities and inconsistent with natural climate variations, according to a new Lawrence Livermore study.

Observed changes agree with computer modeling of salinity trends in a steadily warming world.

Ocean salinity changes are driven by the world's patterns of evaporation and rainfall, which are changing. Observations over recent decades have found a general intensification of salinity differences in which salty ocean regions experience even more evaporation of surface waters and relatively fresh regions are becoming even more diluted with precipitation.

To read more, go to [Innovations Report](#).

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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